# Fusion of Hurricane Models and Observations: Developing the Technology to Improve the Forecasts

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Objective

- Develop the technology to provide the fusion of observations and operational model simulations to help improve the understanding and forecasting of hurricane processes. Specifically:
  - Develop processing techniques to enable multi-source data fusion across hurricane forecast models, satellite data, and in situ sensors.
  - Develop tools to manage the validation and assessment of model comparisons to more easily evaluate the performance of different numerical models.
  - Develop interactive visualization techniques to enable analysis of highly complex systems.
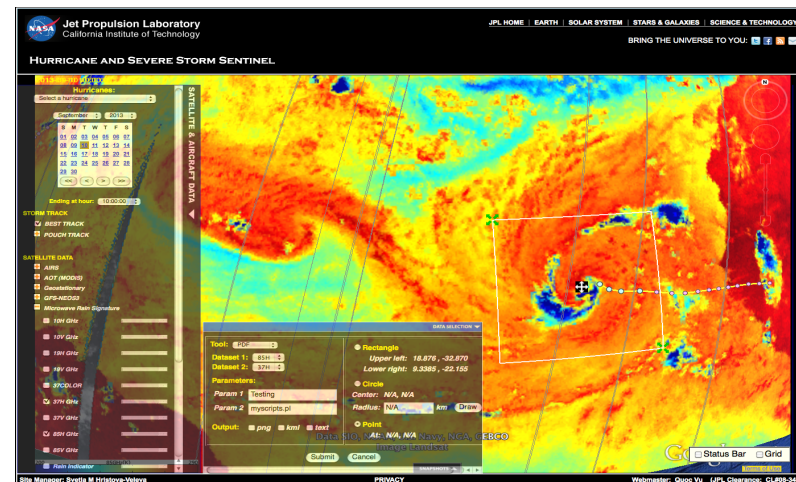
TCIS enhancements support interactive region selection, model and data acquisition, statistical comparison and visualization and analysis

Approach

- Integrate the NASA Earth Observing System Simulator Suite (NEOS^3) with operational hurricane forecast models and incorporate simulated satellite observables into the existing database of satellite and airborne observations (http://grip.jpl.nasa.gov and http://hs3.jpl.nasa.gov).
- Develop a set of advanced analysis tools.
- Develop data immersion technology to enable real-time interaction with the models and visualization of highly complex systems.

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Key Milestones

Milestone	Date
Develop tools (e.g. readers) and database schema for integration of operational models into NEOS^3.	11/12
Develop the framework for determining which satellites/instruments should be simulated at a given time.	05/13
Develop analysis tools based on statistical functions; Produce visualization of airborne data.	11/13
Visualize NWS NexRAD data. Develop analysis tools to characterize the storm structure and asymmetry.	05/14
Integrate spatial database query capability into the JPL Tropical Cyclone Information System (TCIS).	09/14
Finalize database and simulate observational data from the 2013 model forecasts. Develop data query and compositing tools to create composite storm structures.	11/14
Complete analysis tools and all visualization capabilities.	06/15

TRL_{in} = 3 $TRL_{current}$ = 4

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